Memowell®

User Manual

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MAN13266 Rev.C

CONTENTS

INTRODUCTION	3
FUNCTION DESCRIPTION	4-5
PARTS	6
REAR SIDE PANEL	7
BATTERY INSTALLATION	8
ANGLE ADJUSTMENT	9
OPERATION	10
SELECTING LIGHT SEQUENCE	11
TROUBLE SHOOTING	12
MAINTENANCE	13
ORDERING INFORMATION	14
APPENDIX 1: RS232 INTERFACE COMMAND PROTOCOL	15-17

INTRODUCTION

Memowell™ is a 96 well LED lightbox that aids technicians in remembering where next to pipet when working with microwell plates. You can choose between six (6) pre-programmed functions:

1. Single channel light sequences to move via columns.
2. Single channel light sequences to move via rows.
3. Single channel light sequences to serpentine through columns.
4. Single channel light sequences to serpentine through rows.
5. Multichannel light sequences lighting 8 LED's at a time.
6. Multichannel light sequences lighting 12 LED's at a time.

Unique light sequences (duplicates, triplicates, discrete wells, etc.) may be created by using an IBM compatible computer, Memowell applications software and downloading via an RS232 port on the rear of the instrument. Automatic light advances may be accomplished by connecting the Memowell to the console of the Electrapette. Each time the pipet trigger is pressed and liquid manipulated, the lights will automatically advance to the next series of wells to be pipetted. Lights can also be advanced when using a manual footswitch. Memowell is A/C powered or available with optional rechargeable batteries for operation under laminar flow hoods. Memowell can also be ganged together serially with other Memowells, allowing you to track liquids transferred from one plate to another.

FUNCTION DESCRIPTION

1. Single Channel dispensing in columns from A-H.
2. Single channel dispensing in rows from 1-12.
3. Single channel dispensing in serpentine pattern A-H/H-A, etc.
4. Single channel dispensing in serpentine pattern 1-12/12-1, etc.
5. Multi 8-channel dispensing.
6. Multi 12-channel dispensing.

Standard - Allows you to choose any of the above pre-programmed functions (1-6).

Program - Permits you to recall or store up to 6 custom program.

Enter - Is used to confirm your Standard or Program selection (1-6).

Step - These keys (located on left and right hand side of the keyboard) allow you to advance your light sequence by pressing whether of the keys. If you keep the key depressed the LED's will advance rapidly. If key is pressed once only, the LED will advance one well at a time.

Reverse - Reverses the direction of your pipetting sequence. When the instrument is in the reverse mode the LED above the reverse key is illuminated.

FUNCTION

Tone - Activates or deactivates the beep tone by alternately pressing this key.

Power - Turns the instrument on and off.

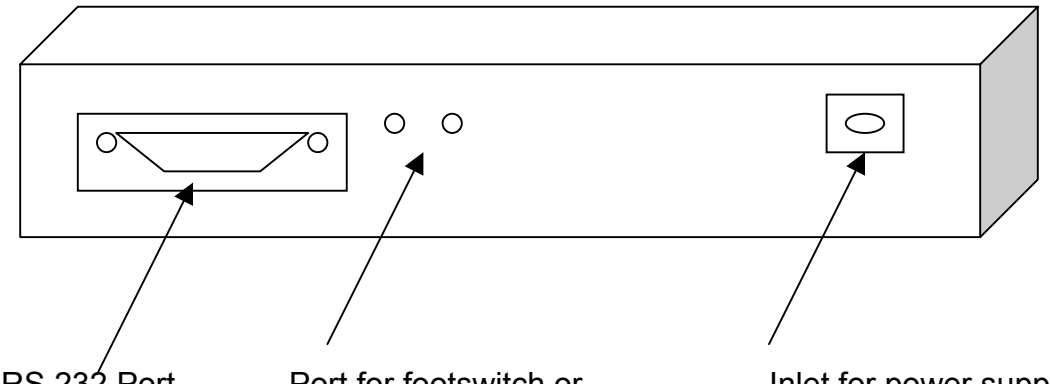
Recharge - The LED starts to blink when it is time to recharge the battery. The LED will start to blink when approximately 20-30 minutes of power remain.

PARTS

Your package should include the following parts:

1. The Memowell™, Catalog No. 5000.
2. Transformer, Catalog No. 8098.
3. 2 Extra long screws (for adjusting the angle of the Memowell).
4. Communication cord for use with Electrapette Console, Catalog No. 5004.
5. Users Manual
6. 6 Rechargeable AA batteries (Optional in U.S.), Catalog No. 5002.

REAR SIDE PANEL



RS 232 Port

Port for footswitch or Electrapette to Memowell communications cord.

Inlet for power supply

BATTERY INSTALLATION

Note - Battery operation is optional.

Before you start using the Memowell make sure that you have installed 6 AA rechargeable nickel cadmium batteries.*

1. Open the Memowell by loosening the four screws at the bottom of the unit.
2. Lift the lid of the instrument and tilt it forward.
3. Correctly orient the batteries in the battery holder.
4. Close the unit and tighten the four screws.
5. Batteries should be charged for 14-16 hours upon installation to fully charge. This is accomplished using the power transformer included with the Memowell. The batteries are charged the fastest with the power in the off mode.

The Memowell may be operated immediately by using the power transformer.

*** Caution! Using non-rechargeable batteries can cause SEVERE damage to the Memowell.**

ANGLE ADJUSTMENT

To adjust the angle of the Memowell please use the supplied "extra long screws" with plastic bushings.

Simply unscrew the short screws found on the Memowell and replace with the supplemental long screws with plastic bushings.

The Memowell can be leveled when these long screws are installed in the front of the unit.

OPERATION

The Memowell is ready for use with charged batteries and/or with power from the wall transformer.

There are three ways to operate the unit:

1. In conjunction with an Electrapette: Connect the Memowell with the Electrapette by using the black communications cord supplied.
2. Utilizing a footswitch (optional) in conjunction with an Impact or manual pipettor.
3. Using the step keys on the Memowell keyboard when using an Impact or manual pipettor.

SELECTING LIGHT SEQUENCE

With only a few keystrokes, you can instruct the Memowell to illuminate the appropriate well sequence.

There are six pre-programmed options of light sequences:

1. Single channel dispensing in columns from A-H.
2. Single channel dispensing in rows from 1-12.
3. Single channel dispensing in serpentine pattern A-H/H-A, etc.
4. Single channel dispensing in serpentine pattern 1-12/12-1, etc.
5. Multi 8-channel dispensing.
6. Multi 12-channel dispensing.

Before selecting your light sequence, make sure the power has been turned on.

To select your light sequence continue to press the Standard key until you reach your choice for a pre-programmed light sequence (options 1-6). When your choice is illuminated, press the Enter key.

Example: You want to dispense liquid into a microtiter plate using an eight channel pipettor. Press the Standard key five times until number 5 is illuminated. Press the Enter key and the first column will be illuminated.

Note: Use of the Program key requires the RS232 port and the commands in Appendix I. This allows you to create your own light sequences e.g. dispensing of duplicate samples, etc.

TROUBLE SHOOTING

PROBLEM	SOLUTION
The power does not work	1. Check the battery installation 2. Recharge the batteries 3. Connect the unit to a power outlet via the transformer
The Memowell does not work in conjunction with Electrapette	1. Check your connection on the rear of the Electrapette. The correct port has not been connected or is not fully connected.
The LED's are moving in reverse direction	1. Press the Reverse key to cancel the reverse movement of the light sequence

MAINTENANCE

Note: Do not leave the Memowell exposed to U.V. light for extended periods. Extended exposure will cause discoloration of the plastic housing.

To clean the instrument, use a soap solution or methanol and gently wipe off the keyboard.

To recharge the batteries, connect the transformer to the rear of the instrument. To recharge batteries to full capacity will take approximately 14-16 hours. A quick charge of 6 hours will result in approximately 4 hours of operation. In the event that something not addressed in this manual should go wrong, or technical questions arise, Matrix Technologies Technical Services Department is available to address your needs. Please contact:

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22 Friars Drive
Hudson, NH 03051

800-345-0206 or 603-595-0505

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ORDERING INFORMATION

CATALOG NO.	DESCRIPTION
5000	Memowell™ Lightbox microplate memory device, includes Electrapette connection cable, leveling feet, and a Swiss Army Knife
5001	Footswitch for Memowell or Electrapette Console
5002	Rechargeable Memowell Batteries 6/pack
5003	Serial Communications Cable
5004	Electrapette Connection Cable

Memowell RS-232 INTERFACE

Command Protocol

Rev 1.00 12/19/89
Applies to Memowell Rel 1.00

This is a protocol for commanding the Memowell via the RS-232 port. The Memowell is commanded either for immediate execution or for program mode (commands are stored for later execution).

Each LED has a unique identifier (address) for programming. The LED identifiers are as follows (looking down on the face of Memowell):

Top Left Top Right

01	09	17	25	33	41	49	57	65	73	81	89
02	10	18	26	34	42	50	58	66	74	82	90
03	11	19	27	35	43	51	59	67	75	83	91
04	12	20	28	36	44	52	60	68	76	84	92
05	13	21	29	37	45	53	61	69	77	85	93
06	14	22	30	38	46	54	62	70	78	86	94
07	15	23	31	39	47	55	63	71	79	87	95
08	16	24	32	40	48	56	64	72	80	88	96

Bottom Left Bottom Right

Memowell status LEDs are not controllable by the host computer.

Memowell commands are sequences of ASCII (printable) characters. Each command is terminated by a carriage return (CR) (but no line feed (LF)). The CR causes Memowell to execute the just-received command. As characters are passed to Memowell, Memowell echoes them. The terminating CR is echoed as a CR+LF. The echo of the CR as a CR+LF signals the host computer that Memowell has received and executed the just-received command.

The Memowell RS-232 interface consists of the following 5 lines:

Pin	2	Data from host into Memowell
Pin	3	Data from Memowell out to host
Pin	4	Request to Send from host into Memowell
Pin	5	Clear to Send Used by Memowells to claim use of pin
Pin	7	Signal ground

A +6V to +12V level on pin 4 signifies that the host is ready to receive characters. Pin 5 is used in multi-Memowell networks to allow only one Memowell at a time to transmit data back to the host. Pin 5 should be ignored by the host. The two DB-25 connectors are connected in parallel.

The Memowell command set is:

#n Attention. This command initializes the communications with Memowell. The n is the Memowell address, used in multi-Memowell configurations where 2 to 9 Memowells share a common RS-232 link with the host. In this case, communications is established with the Memowell that has been previously assigned address n. Memowell n responds by echoing the n (its address) and a colon. The default address for all Memowells is 0. A 0-address Memowell will respond to any addressed attention. Also, the attention command issues with an address of 0 ("#0,CR") will cause every Memowell on the network to respond (a mess if there are actually multiple Memowells on-line).

X Hang-up character. This character terminates the communications with the active Memowell. As soon as the command is received, the active Memowell will go off-line. The Memowell echoes the X, then echoes the CR as a CR+LF.

An Assign address n. This command assigns the address n to a single Memowell for later use in a Multi-Memowell configuration. The value of n can be 1 to 9. The default address is 0, for use only on single-Memowell configurations. Executing the A command on a Multi-Memowell configuration will cause mass confusion as all Memowells will be assigned the same address. The host program must ensure that this command is not issued into a Memowell network. If it is, the network will have to be disassembled, and Memowells put on line individually for reassignment of addresses.

C Clear the display. Turn off LEDs 1 through 96.

Nn	Turn on LED n. Here n can be between 1 and 96.
Fn	Turn off LED n, n between 1 and 96.
Bn	Blink LED n, n between 1 and 96
T	Sound the Tone.
Wn	Wait unconditionally for n units of time.
S	Wait for a footswitch depression.

Pn Program number n. Here n can be 1 to 6. Executing this instruction causes program n to beerased and the following commands to be stored as program n. Commands are stored until an asterisk followed by CR is sent. The asterisk is the last command stored, and marks the end of the program for Memowell. No facility for loading part of a program is provided. The entire program must be loaded at one time.

Rn Read program n, for n between 1 and 6. Executing this instruction causes Memowell to dump the contents of program n over the RS-232 link to the host. The Memowell expects no echo each. The program is read until the first asterick is encountered, signifying the end of the program.

D Display Memowell revision and unit address.

Programs can be demonstrated and debugged using the immediate mode (issuing N, F, B commands). Each program in Memowell can contain up to 840 characters. This corresponds to about 250 commands. When full, the Memowell will refuse to echo characters. The programming can be restarted by another P command. The responsibility for keeping track of the program length rests with the host computer.

The host computer can issue commands to Memowell 1, creating some display pattern. Then it can hang up on Memowell 1, and command Memowell 2 to display some independent display pattern. Meanwhile, Memowell will continue to display as previously commanded. A user can interrupt any Memowell that is not in active communications with the host by selecting a program.

This protocol is subject to change.